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USE OF HOG CHOLERA SERUM.

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USE OF HOG CHOLERA SERUM.

BY J. H. GAIN.

It is estimated that the annual loss from hog cholera in Nebraska for the last two years has been at least $5,000,000. The serum treatment originated by Drs. Dorset, McBryde, and Niles of the United States Department of Agriculture has proved to be the only successful means of combating this disease. As the success or failure of this treatment depends very largely upon the proper administration of the serum and virus, a study of the following pages may be found helpful. No new facts connected with the serum treatment are presented. It is believed that a better knowledge of the fundamentals in serum treatment is necessary before uniformly good results are obtained.

As the Simultaneous treatment has been very largely used in this State during the past two years, it is fair to assume that a part of the lessened cholera this year is due to this method. The first six months of 1915 finds the State with 50 per cent less cholera than a year ago. This would tend to disprove the contention that the use of virus is spreading the disease.

TRANSMISSION.

Hog cholera is transmitted most often by contact of one animal with another in infected quarters. Figures obtained by the United States Department of Agriculture in the various demonstration areas show the farmer to be the greatest offender in the spread of this disease by the exchanging of labot and by visiting infected farms. Birds are common carriers of infection. Cows, on account of ranging over a wide territory and their habit of foraging in hog lots, are especially active. Dogs that are supposed to be at home nights may travel several miles, bringing home infection on their feet of on bones from a diseased carcass.

Public stock yards are always more or less infected, and visitors to these places may carry away the infection on their shoes. Stock cars have doubtless often carried the disease into remore sections. New stock, altho immune, may carry the germs on their bodies from an infected farm.

A study of hog cholera will show a greater variety of symptoms and of post-mortem lesions than any other disease that affects farm animals.

In some herds one or two animals may be noticed off feed for a while, and then they may show a gradual improvement and finally recover. These animals may infect the entire herd and the outbreak become gener l before there is any suspicion that the trouble is cholera. While the first one or two hogs, owing to their greater resistance, may have had cholera in the chronic form, other animals in the herd may quite generally have the acute type and die rapidly; or again, the whole herd may have a slow or mild type of cholera with only an occasional death. In this case, cholera is not always suspected, and yet this herd may be the center of a wide infection. The acute type leaves no doubt as to the disease, the hogs dying rapidly and most of them showing the symptoms commonly associated with cholera. Where the acute type of cholera has once visited a farm, the farmer is often slow to believe the slower, or chronic, form of the disease to be cholera, and before he is aware, the whole herd is more or less affected.

In hog cholera there is sometimes found a condition commonly called "swine plague" or "infectious pneumonia," where the lungs seem to be the only part of the animal affected. Many have believed that this condition could not be combated by the use of serum. At the University Serum Plant, blood from typical cases of swine plague injected into susceptible pigs developed the acute type of cholera without the lung complications. It was found that serum would protect against blood from these pigs as well as against the blood from hogs showing normal cholera symptoms. Serum has been used against several outbreaks in this State where the post-mortem lesions were those of swine plague, and was found potent to protect against this form of cholera as well as against those cases where the lesions were entirely those of hog cholera.

Whenever a disease that is contagious appears among hogs, spreading more or less rapidly, is quite uniformly fatal, and is accompanied by a high temperature, it is quite safe to assume that it is cholera.

Where cholera is suspected, it is well to get a thermometer and take the temperature of a number of those that are apparently well. The normal temperature is from 101 to 103 degrees in winter and about 1 degree higher in summer. If cholera is present, temperatures will be found as high as 105 to 107 degrees.

Make a post-mortem examination of a hog that has just died and examine the kidneys for small, dark red spots resembling those on a turkey egg. Look for small, bright red spots along the small intestine and somewhat larger ones on the lungs.

The lymphatic glands, which are found in the flank, along the intestines, and between the lungs, and which are a light color in health, will be found congested and varying from a pink to a very dark color.

Where the services of a qualified veterinarian can be obtained, he should be called to make a post-mortem examination and to give serum.

USING SERUM.

For the injection of serum, a syringe holding 30 or 40 c. c. (cubic centimeter) should be used, while for virus an 8 or 10 c. c. capacity will be large enough. These should be sterilized before using by loosening or taking apart and boiling for 20 minutes. Test with cold boiled water before using, to see that they will fill readily. Where the herd is large, time can be saved by having two serum syringes and an assistant to fill them. The movable disk on the plunger of the virus syringe is for the purpose of regulating the dose. Always sterilize after using and leave plunger loose when not in use.

The serum can be poured into a pint fruit jar that has just been boiled, and should be kept covered. The virus can be put into a smaller jar or small wide-mouthed bottle with cover.

A convenient arrangement for handling the serum needles can be had with an ordinary glass tumbler and a sponge. Put both tumbler and sponge down into a bucket of clean water and while under water place sponge in tumbler, pressing it down about a half inch from the top. Remove from bucket, pour off the water from the top of the sponge, and fill this space with a strong antiseptic such as 15 per cent carbolic acid or coal tar dip solution. The serum needles are then stuck equal distances apart around the edge of the tumbler and are changed for each animal. By working around the glass, always in the same direction, each needle remains in the strong antiseptic 6 or 8 minutes, and the fingers do not come in contact with the solution. Give the needle a quick snap as it is withdrawn from the antiseptic, to clean it. The solution should be changed several times for a large herd.

The syringes, serum, virus, and antiseptics should be placed on a table or strong box outside of the pen where there is no liability of being upset. The top can be covered by newspapers, which should be changed as they become soiled. Have a bucket of water and a towel convenient for keeping hands and instruments clean.

Keep the hogs in a dry place for 24 hours before vaccinating, in order that they may be as clean and dry as possible. Muddy

hogs are not easily handled and the liability of abscesses is increased. Too large a number should not be put in one pen, as they are likely to pile. During warm weather the work should be done as early in the morning as possible. If the hogs are shut in on a hot day where the air does not strike them and they begin to pile, the temperature begins to rise until soon the temperature of all is above 105 degrees. Should there be infection in the herd this would be misleading.

In vaccinating shoats up to 150 pounds, use can be made of a large V-shaped feeding trough. This can be placed up from the ground about two feet with one end against the outside of the pen. In some cases, it may be found more convenient to have the trough lengthwise of the pen and just outside. A slat should be nailed across the trough about five feet from one end. As the pigs are caught they are laid on their back in the trough with the nose shoved under the slat. The hind legs are then stretched backward and the front legs pulled ahead and slightly outward. A small depression will be shown in the arm-pit on each side. This area should be brushed if the hog is dry, washed if dirty, and the point of injection painted with iodine. The injection of serum is then made deeply into the small depression at the back of the armpit, dividing the dose equally between the two sides. Where more than 40 c. c. of serum is given, a third injection can be given just under the skin in the flank, spreading it over an area of several inches. The virus can be injected deeply into the opposite flank.

Two men can easily throw and hold hogs up to 400 pounds in weight. They should each take a leg on the side nearest them and quickly straighten up. As the hog falls on its side the man holding the front leg steps over to the back side of the hog and holds the front leg doubled back at the knee. The other man pulls the hind leg straight backward. The lower legs should not be held, as this gives the hog a purchase iu struggling. Very heavy hogs can be vaccinated in a crate or they can be snubbed to a post by passing the loop end of a rope around the upper jaw. Where a large dose of serum is given it should be injected into the armpits and in several places in the flank, spreading the dose somewhat. The virus can be injected back of the ear.

Where there is infection already in the herd, it is of the utmost importance that the temperature be taken of every animal. A hog infected with cholera will carry a high temperature for from three to five days before showing any signs of being affected, and during this time is taking his regular feed and to

all outward appearance is perfectly well. During the early period of the rise in temperature, if given from 50 to 100 per cent increase over the regular dose of serum, a large per cent will be saved. As every drop of the blood of such a hog is virulent, the reason can be seen for a large dose of serum. The ordinary dose is wasted here. Insert the thermometer when the pig is laid in the trough. By the time the animal has been cleaned and the serum injected, it is ready to withdraw, and the reading will determine whether a dose of virus or more serum should be injected. If the pigs have not run the temperature up by piling, virus should be given each one under 105 degreew. The dose of serum should be increased above 104 degrees. Whenever in doubt, increase the dose of serum and give a dose of virus.

It is not thought necessary to give virus where the temperature s above 105 degrees, altho where a pig has 1,000 c. c. or more of virus already in his system, it is doubtful if 1 or 2 c. c. more does any harm.

All pigs vaccinated showing a high temperature should be marked either by placing a nose ring in one ear or by cutting across the hair with a pair of shears. If the cut is made of good length and always in the same place, those pigs can easily be picked out. For accurate information as to results of vaccination this is important. Failure to take temperatures in infected herds and to give an increased dose of serum to those carrying a high temperature has been the cause of bringing the whole serum treatment into disrepute in certain communities. Without taking this precaution, the operator is working in the dark. The man who has not time to take temperatures and vaccinate accordingly has no business vaccinating hogs.

In order to acquire a lasting immunity by vaccination, a hog must be infected with cholera within a few days after receiving serum. He may either be injected with a small amount of cholera blood (virus) or get infection by running in an infected herd. Where serum is used without the injection of virus or having natural infection, the protection lasts only three or four weeks, when the hog again becomes susceptible to the disease.

Where only a few hogs in a large herd are sick at the time the Serum Alone method is used, it is not possible for all the hogs to become sufficiently infected to acquire a long time immunity. This accounts for some hogs dying with cholera several weeks after receiving the Serum Alone treatment. At best the Serum Alone method is an emergency treatment, and the most satisfactory results must come from the Simultaneous method.

Pigs from immune sows are usually immune until weaned, but there are some few immune sows that do not give any protection to their litters, their pigs getting cholera within a few weeks if on infected ground. The pigs should be watched closely, and if symptoms of cholera appear they should all be given Serum Alone, which will probably carry them past weaning.

In order to acquire a long time immunity, pigs should weigh 50 to 60 pounds at the time of receiving the Simultaneous treatment. Suckling pigs vaccinated by the Simultaneous method, or having a natural immunity, usually lose this immunity about the time of weaning and should be given the Simultaneous treatment when they reach 50 or 60 pounds.

If sows that are within two or three weeks of farrowing are exposed to cholera, they should be given Serum Alone. Where they are not so far along, give the Simultaneous treatment. If carefully handled and a liberal dose of serum is given, the percentage of abortions will be small. Where the dose of serum is large, there will seldom be a rise in temperature and consequently little danger of abortion. It is not necessary that there be any rise in temperature following Simultaneous vaccination to have permanent immunity.

Do not give less than 1 c. c. of virus to the smallest shoat and a full 2 c. c. to the larger animals. The practice of giving too small a dose of virus has often been responsible for herds not receiving a permanent immunity. When it is remembered that a very large per cent of infected hogs can be saved by a liberal dose of serum if given during the early rise in temperature, it will be seen that a relatively small dose of serum is given successfully against a large amount of virus—in such cases 1,000 c. c. or more.

Do not underestimate the weight of the shoats when ordering or using serum. This is a common mistake and leads to pinching in both serum and virus. Order enough serum so that there will be some left. There may be a few oversusceptible pigs in the herd that will show signs of being off feed in about seven days, and if at once given a liberal dose of serum, they will usually recover. One pig will pay for a large quantity of serum.

Leave the hogs in a dry place for 48 hours after receiving serum and reduce the feed by half for two weeks. Feed very little corn.

Never use virus in an unthrifty herd. If cholera breaks out in such a herd, use Serum Alone and two or three weeks later, when they have improved in condition, give the Simultaneous treatment. If the unthrifty condition is due to worms, give some well-known worm remedy.

Where there is no cholera in the vicinity, it is not advisable to vaccinate, on account of the possibility of starting a center of infection. The exception to this is the breeder of pure-bred hogs. The demand at present is so strong for immune stock that many wish to keep an immune herd even tho there is no cholera in the immediate neighborhood. Where virus is used in such cases, the owner should use every precaution against infecting the premises. Use plenty of serum and have a supply left over. If a pig shows any signs of being sick within two weeks after vaccinating, give a large dose of serum and place in a small pen that can be easily disinfected. If the animal dies, it should be burned at once and the pen thoroly disinfected. If it recovers, the same attention should be given the pen. Handled in this way there should be little or no danger of starting cholera in a community.

Whenever hog cholera visits a farm, notice to this effect should be sent to adjoining farms and also given to all visitors.

Hogs which die from any cause should at once be burned so as to lessen the danger of spreading disease. This can be done quite easily by digging a trench and placing across it a few bars of old iron. The carcasses should have the flesh split open in a number of places and a little coal oil poured over them. With a very little wood they will burn almost entirely. Cholera hogs that are buried with but little dirt over them are easily dug up by dogs.

It would be well to make a practice of burning the carcass of every animal that dies on the farm.

ORDERING SERUM.

If serum is wanted, use the telephone or telegraph. Do not *write a letter requesting serum.* The mails are uncertain and slow for such purposes, and the larger part of the herd may become infected before serum could be received if ordered this way.

Always give the number and weight of the well hogs in the herd. If a certain number of doses are ordered it will be assumed that the minimum dose is meant.

The serum is put up in bottles containing 100, 125, 200, 250, 500, and 1,000 c. c. It will be shipped by express, C. O. D. Address all letters regarding serum to

"Serum Laboratory, University Farm, Lincoln, Nebr."

This Department will endeavor to deliver serum at the express office promptly upon receipt of orders which it can fill, but the

delays en route from sending material by express are frequent and sometimes unexplainable. We cannot be responsible for delays of serum in transit.

Read carefully the directions inclosed with each shipment of serum.

At present the price of serum produced by the serum plant at the University of Nebraska is one and one-fourth cents per cubic centimeter.

Personal checks should be written with exchange added, so that cost of collection will not be charged to this office.

We do not refund money for serum not used. Owing to the possible deterioration of serum thru standing in the sun or in other places where it is subject to high temperatures, we will send out no serum for use except that going directly from our refrigerators to the user. Serum which has been ordered and shipped will be the property of the purchaser and not subject to return. We do this for the protection of the users of serum. We do not feel safe in sending out to the trade serum which possibly has stood in express offices or in hot granaries or sheds for a week or two and is then returned to us unused. Order just what serum is needed, use it immediately upon being received, or, if it must be kept for a few days before using, place it in a cool cellar or in a refrigerator. Serum kept in a refrigerator or cool cellar will keep for several months.

A 40 c. c. serum syringe can be furnished from this office for $4, an 8 c. c. virus syringe at $2.50, and thermometers at 50c each.

DOSAGE (of Sérum and Virus).

Serum Alone.	*Serum*	Serum Simultaneous.	*Serum*	*Virus*
Pigs up to 15 pounds	10 c. c.	Pigs up to 15 pounds	15 c. c.	1 c. c.
" 15 to 30 pounds	15 c. c.	" 15 to 30 pounds	25 c. c.	1 c. c.
" 50 to 100 pounds	25 c. c.	" 50 to 100 pounds	40 c. c.	1 c. c.
" Above 100 pounds per 100 pounds	25 c. c.	" Above 100 pounds per 100 pounds	40 c. c.	2 c. c.

(8-20-'15-20M.)